2

GENERAL AND REVENUE SECRETARIAT.

1914.

(Gen-Mis.)

Preserve

File No. 156-14

Serial Nos. 1-19

Papers Filed.

Month Jany. 15

SUBJECT.

Invention for "Apparatus for the Separation of finely divided Solids from liquids" by Lt. John Van Nostrand Dorr.

PREVIOUS REFERENCES.	LATER REFERENCES.
	Gen 107-15 Cls 1-3 " 225-15 Cls 1-3 Ptc 197-21 (1-5)

Ref 9/3

G.R.S. 11] 1914-15.

GENERAL AND REVENUE SECRETARIAT.

(gen : mis)

NOTES.

gen File No. 156 14/15-

FILE HEADING.

Invention for "Apparatus for the separation of finely divided solids from liquids" by Mr. John Van Nostrand Dorr

From

Messrs Remfry & Son, Calcutta

No. - Dated 13. 7. 14 Received 16. 7-14

Diary No. 485	Enclos. 2 Rs 11 Spare Copies. -	Serial No. 1

BRIEF ABSTRACT OF LETTER.

Forwards an applⁿ for leave to file a specification of the above named invention and also a power-of-attorney and remits Rs 11/- as application and stamp fees.

NOTES AND ORDERS.

Under Cl (11) of Schedule IV of the Mysore Inventions & Designs Regulation XI of 1894, the fee payable in respect of an application for leave to file a specification of an invention is Rs 10/-; and Re 1/- is the stamp fee for a Special Power-of-attorney. These amounts have been received.

NOTES—First Sheet.

GPB—35,000—15-6-12

General and Revenue Secretariat.

G.R. File No. 156 of 1914.

Serial No.	
	The usual drafts are subd.
	G.A. 20/8/14 appd. Issue Mm 21.8.14
2	To the Supdt of Stamps. No. G 2279 dy 29. 8 14. Forwards the power-of-attorney rec'd. with the above & also Receipt & requests that the power may be impressed with the Mysore Stamp of that value & returned.
3	To the D.C. Tkg, Bangalore. No. 2280 dy 29. 8 14 Forwards Rs 10/- on a/c of the amount rec'd. with Sl 1 & requests acctt.
4	To the State Geologist. No G 2281 dy 29. 8 14. Forwards for opinion the specimen rec'd. with Sl 1
5	From the Supdt of stamps. No. G 83 dy 5. 9. 14 Returns duly stamped the power forwarded with Sl 2 & requests acctt. Draft acknowledging is subd G.A. 16.9 Issue Mm 18.9
6	To the Supdt. of Stamps. No G 3404 dy 2. 10. 14. Acknowledges the receipt of the stamped document forwarded with the above.
7	From the D.C. Bangalore. No. 1054/48 dy 5. 9. 14. Acknowledges the receipt of the amount forwarded with Sl 3.
8	From the State Geologist. No 572 dy 15. 9. 14. with reference to Sl 4, states that the leave applied for

NOTE—Contn. sheet.

GPB—10,000—13-6-14

Serial No.	
	for filing the Specifn may be granted.
	The usual drafts subd
	9/A bms 10/10/14 Issued Mss 12/10.
	Issued - 16-10-14.
9	To Mr. John Vann Nestrand Dow. No. Cs 3683 dy 16-10-14
	Authorises him to file a Specifn of the invention.
10	To Messrs Remfry & Son. No. Cs 3684 dy 16-10-14.
	Forwards the above for intimation to the party concerned.
11	From the same. No. dy 24-1-15
	Forwards Rs 30/- and 4 copies of the Specification and requests the filing of the Specification.
	The usual drafts are subd. The certificate at foot of the Order (both and pair) requires signature.
	9/A 23/1/15 VS Issued Mss 23/1
12	To the Compiler, Mysore Gazette. No. Cs 8096 dy 1-2-15
	Notifies the filing of the Specifn.
13	To Messrs Remfry & Son. No. Cs 8097 dy 1-2-15.
	Forwards copy of the above & returns Sl 9 with the certificate at foot duly signed.
14	To D.C. Hy, Bangalore. No. Cs 8098 dy 1-2-15.
	Forwards Rs 30/- recd with Sl 11 & requests ackt
15	To the State Geologist, Supdt, Govt Museum & Chief Engr
	No. Cs 8099-901 dy 1-2-15. Forwards copy of the Specifn & requests ackt.

NOTE—Contn. sheet.

GPB—10,000—13-6-14

General and Revenue Secretariat. | Gen File No. 156 of 1914.

Serial No.	
16	From D.C. Wg, Bangalore. No. 204 dt 3.2.15 Acknowledges receipt of the amount forwarded with sl 14
17	From the State Geologist. No. 1480 dt 3.2.15 Acknowledges receipt of specimens forwarded with sl 15 The remaining replies W sl 15 may be awaited. Subd 9.2.15 hms Sgd hms Asst 10/2
18	From the Supdt - Govt Museum - No 124 dt 8.2.15 acknowledges receipt of the specimens forwarded with sl 15
19	From the Chief Engr - No 1517 dt 13.2.15 — do — The papers may now be filed. hms 6/3/15 Sgd Asst 6/3

NOTE—Contn. sheet.

GPB—25,000—2-11-14

1914-1915
SECTION Gen & Mis
FILE No. 156 of 1914-15

REGISTERED.

To

THE ~~PATENT~~ SECRETARY, TO THE GOVERNMENT OF MYSORE,
~~PATENT OFFICE~~, SERVICE NO. ~~GENL. & REV. DEPTS.~~,
~~CALCUTTA~~ BANGALORE,
MYSORE.

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
CALCUTTA.

Dated CALCUTTA, the 13th July 1914.

Sir,

Dept. P. File No. M.
FILE INDICATION.
Mysore Pats.

re J. V. N. DORR. (MYSORE)

We have the honour to forward herewith an Application of JOHN VAN NOSTRAND DORR, of 730 First National Bank Building, Denver, Colorado, United States of America, Metallurgical Engineer, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation, 1894, in respect of an Invention for "APPARATUS FOR THE SEPARATION OF FINELY FIVIDED SOLIDS FROM "LIQUIDS", and solicit the favour of your submitting the same to H. H. the Dewan.

The Power of Attorney under which we are acting is enclosed and we solicit the favour of your having same stamped Re.1/-

A Post Office Order for Rs. 11/- is sent to-day.

We have the honour to be,

Sir,

Your very obedient servants.

REMFRY & SON.

MYSORE
APPLICATION.

I.M.B.

1,000.—17-3-11.

From

Secy. to the Govt. of His Highness
the Maharaja of Mysore,
Genl. and Rev. Dept.

To

The Superintendent of Stamps,
Bangalore.

Dated
Despatched 29. 8. 14
Received

General No. G 2279
No. Fm 156-14-2
Enclosure No. One

Has the honor to forward herewith the power-of-attorney executed by Mr. John Van Nostrand Dodd, constituting Messrs Remfry & Son, Calcutta, as his Agents in respect of his invention for "Apparatus for the separation of finely divided solids from liquids", and to request that the same may be impressed with the Mysore general Stamp of the value of Re one also herewith forwarded, and the document returned to this office.

By Order,
29.8.14
For Secretary

MGCPT—20,000—16-2-05.

G.R.S. 29A]

190 . (3)

From

Secy. to the Govt. of His Highness
the Maharaja of Mysore,
Genl. and Rev. Dept.

To
The Deputy Commissioner,
Treasury Deptt, Bangalore

Dated
Despatched } 29-8-14

Received

General No. C, 2280

No. Gm 156-14-3

Enclosure No. Enc. Rs 10/-

Has the honor to forward herewith a sum of Rs 10/- (Ten only) received from messrs Remfry & Son, Calcutta, being the application fee for leave to file a specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr. John Van Nostrand Dorr, and to request the favor of an acknowledgment for the receipt of the amount.

By Order,

For the Secretary

MGCPT—20,000—16-2-05.

From

Secy. to the Govt. of His Highness
the Maharaja of Mysore,
Genl. and Rev. Dept.

To

The State Geologist
in Mysore.

Dated
Despatched } 29. 8. 14
Received

General No. G 2287
No. Fm 156-14-4
Enclosure No. One

Has the honor to forward herewith for report under Sec 6(2) of the Mysore Inventions and Designs Regulation No. XI of 1894, an application for leave to file a specification of an invention for "~~An~~ Apparatus for the separation of finely divided solids from liquids" by Mr. John Van Nostrand Dorr of 730, First National Building, Denver, Colorado, U. S. A., Metallurgical Engineer.

By Order,

MSR
21. 8. 14
for the Secretary

MGCPE—20,000—16-2-05.

Stamp 19]

GPB—200—2 9-13

SECTION Gen : Mis
FILE No. 156 - 14

OFFICE OF THE SUPERINTENDENT OF STAMPS IN MYSORE.

BANGALORE, DATED 5 September 1914

No. 83
Enc. 1

From

T. Lakshminarasimha Row, Esq., B.A.B.L.

Superintendent of Stamps

in Mysore.

To

D. Narasinga Row, Esq., B.A.B.L.
Offg. Secretary to the Government of
His Highness the Maharaja of Mysore
General and Revenue Departments

Sir,

I have the honor to return herewith duly Stamped with one Rupee the Power of attorney received with your Docket no G. 2279 dated 29th ultimo, received this day, Gen 156-14-2 and to request the favor of an acknowledgment.

I have the honor to be
Sir
your most obedient Servant

Superintendent of Stamps
in Mysore.

GOVERNMENT OF MYSORE
SP
14
1 RUPEE

POWER OF ATTORNEY.

(6)

In the matter of the Inventions and Designs Regulation, 1894, of the Government of Mysore and in the matter of **JOHN VAN NOSTRAND DORR, of 730 First National Bank Building, Denver, Colorado, United States of America, Metallurgical Engineer, an Inventor.**

I, the above named, JOHN VAN NOSTRAND DORR,

do hereby retain, constitute and appoint **the members of the Firm of REMFRY & SON, of 8/2 Hastings Street, Calcutta, British India, Solicitors and Patent Agents,** - as my Agents and Attorneys to apply for and obtain from the Government of Mysore and keep in force an Exclusive Privilege or Letters Patent for **"Apparatus for the separation of finely divided solids from liquids"**

and I authorize **them or either of them** to sign my name to such papers and writings and do such acts regarding the same, including the appointment of a substitute or substitutes, as may be necessary or expedient.

DATED this 14th day of May 1914

John van Nostrand Dorr

SIGNED, SEALED AND DELIVERED AT)
Denver, Colorado, U.S.A.)
in the presence of:-

Adelaide Bartlett
730 First Natl. Bank Bldg.
Denver, Colorado, U.S.A.
Stenographer

Walter W. Scott
730 First Nat Bank Bldg
Denver, Colo. U.S.A
Clerk

MYSORE GOVERNMENT
GENERAL STAMP

G.R.S. 29A]

2/9 2108

190 .

From

Secy. to the Govt. of His Highness The Maharaja of Mysore, Genl. and Rev. Dept.

To

The Superintendent of Stamps in Mysore.

Dated
Despatched } 2. 10. 14

Received

General No. 9,3406

No. Fm 156-14-6

Enclosure No.

Has the honr to acknowledge the receipt of the duly stamped power-of-attorney forwarded with his letter No. 83 dated the 5th Septr 1914.

By Order,
Asst
1/9
For Secy.

GPB—10,000—9-4-06.

Rs 10-0-0 Book No. 1054/48 No 58

Bangalore District Treasury dated 5/9/1914.

Received from The Secretary Govt of Mys: Depty Bangalore.

Rupees Ten only

Annas ~~~~ and Pies ~~~~ being on account of

application fee to file a Specification of an invention for the Separation of finely divided solids from liquids received with his docket no: G.2280/Eqn.

156-14-3 dy 29-8-1914.

M. Sreenivasulu
In charge of Treasury.
Bangalore

Noted and ack^d to Branch V

MG
9/9

M.G.D. 13]

MYSORE GEOLOGICAL DEPARTMENT.

DATED BANGALORE, 15th September 1914.

DIARY No. 2484

No. 572 Encl 1.

19 -19
SECTION
FILE No.

FROM

DR. W. F. SMEETH, M.A., D.SC., [illegible] etc.,
State Geologist in Mysore.

fm 156-14-8

To

D.M. Narasinga Rao, Esquire, B.A.,B.L.,
Offg. Secretary to the Government of His Highness
the Maharaja of Mysore,Gen.& Rev. Depts.

SIR,

In reply to your No.G.2281, dated 29th August 1914, G.M.156-14-4 forwarding for report an application for leave to file a specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr. John Van Nostrand Dorr of 730, First National Building, Denver, Colorado, United States of America, Metallurgical Engineer, I have the honour to state that the design and arrangement of the apparatus described in the specification is sufficiently novel and practicable to warrant the leave applied for being granted. The claims are also in my opinion reasonable and sufficiently specific.

2. The papers received with your letter under reply are returned herewith.

I have the honour to be,

Sir,

Your most obedient servant,

W. F. Smeeth

State Geologist in Mysore.

C.N.

2.

A P P L I C A T I O N

TO THE DEWAN OF MYSORE.

The Application of JOHN VAN NOSTRAND DORR, of 730 First National Bank Building, Denver, Colorado, United States of America, Metallurgical Engineer, for leave to file a Specification under Part I of the Mysore Inventions and Designs Regulation 1894.

1. The Applicant is in possession of an Invention for "Apparatus for the separation of finely divided solids from liquids", he is the Inventor thereof; and, to the best of his information and belief, the Invention is new within the meaning of Part I of the Inventions and Designs Regulation, 1894, and no circumstance exists which, if the Applicant is authorized to file a Specification and files it in accordance with that Part, will disentitle him to an Exclusive Privilege thereunder in respect of the Invention.

The Applicant has not applied for a Patent in the United Kingdom in respect of this Invention.

The Applicant has not applied for a Patent in British India in respect of this Invention.

2. The following is a description of the Invention:-

This invention relates to apparatus for effecting the rapid separation, by a process of settling, of finely divided solid particles from large volumes of liquid in which they are suspended, so as to produce on the one hand a continuous overflow of clear liquid and on the other hand an underflow or sub-surface withdrawal of the solid particles mixed with a relatively small proportion of the liquid, in the form of a thickened slime or pulp. The invention is particularly applicable to the handling of the large volumes of water used in the water-concentration of ores containing valuable minerals. This water carries in suspension quantities of finely divided solids, small in proportion to the quantity of water but great in the aggregate, and containing substantial metallurgical values in the recovery of which economy of handling is of prime importance. In many plants, moreover, the cost of the water is such that its clarification for re-use is essential to profitable operation. It is the custom now to recover the water and thicken the slimes or pulp in a multiplicity of small settling tanks, either 60° cones or cylindrical coned-bottom tanks, which are expensive to install and require great attention and careful regulation. The thickener disclosed in my U. S. patent No. 867,958 of Oct. 15, 1907, permits the use of large units to replace the cones, and is in use in many plants for the same purpose; but these units occupy a large floor space, and the duplication of units involves the duplication of operating mechanism and accessories, while certain practical limits are imposed upon the size of the tanks that can be profitably used because of structural considerations and because the

slowly revolving sweeps which are necessary in such thickeners attain in their extended extremities a speed such as to stir up the liquid and prevent settling, if the speed at the center is sufficient to avoid solid packing of the thickened material. Furthermore the strains incident to the movement, by the sweeps, of solid material deposited near the periphery becomes excessive.

The present invention is based upon the fact that in place of the thickening tanks eight to twenty feet deep usually employed for this purpose, it has been found to be possible, without reducing the settling capacity, to substitute tanks so shallow that the space below the surface current or flow disturbance is practically eliminated. My invention therefore contemplates providing tanks which are shallow and of such depth that the settling zone is located substantially directly beneath the zone of surface current or flow disturbance, and these tanks can be readily superposed with the result that with a given floor space, building, operating mechanism and the like, it is possible to provide a total settling area considerably larger than has heretofore been feasible. In practice, I use tanks about three feet or less in depth and secure thoroughly satisfactory results, the solid matter being deposited with undiminshed efficiency from the flowing current in its passage through the separating region. I may arrange such trays within a containing tank, into which the clear liquid, rising over the edge of the tray flows. This arrangement has the following advantages (1) The total discharge from the tank is only slightly below the inlet level, whereby millhead is conserved (2) If the containing tank is of large

capacity, it serves to some extent as a reservoir of the thickened slimes during temporary reduction or cessation of the underflow and (3) If desired, a preliminary thickening can be effected in the contained tanks while the final thickening takes place in the lower part of the containing tank. A further feature of the invention relates to the delivery of the material to be operated on in the tanks through a delivery trough or the like, and in accordance with the invention, in order to permit of readily equalizing the delivery to each tank, this delivery trough is divided along part of the length thereof into a number of channels from which extend conduits or the like leading to a series of separating trays.

In the accompanying drawings, I have shown several embodiments of my invention.

Fig. 1 shows a vertical central section through a separating apparatus embodying the invention in a developed form involving the use of a plurality of superposed cylindrical trays in a single enclosing tank.

Fig. 2 is a detail view on an enlarged scale showing particularly how the common discharge pipe for the trays is related to said trays, and how the sweeps are attached to and supported on said pipe.

Fig. 3 is a view similar to Fig. 1 of an apparatus in which the trays are formed with inclined or coned bottoms.

Figs. 4 and 5 are detail views on an enlarged scale showing different forms of sweeps.

Fig. 6 is a central vertical section

through a further modification of the separating apparatus in which the discharge from the several trays is led off separately and may be separately controlled.

Fig. 7 is a section on the line 7-7 of Fig. 6.

Fig. 8 shows a vertical central section of a modified form of the apparatus, in which a plurality of cylindrical settling vessels or tanks are arranged one above the other and supported on a suitable frame, there being in this instance no tank for enclosing the trays or settling vessels.

Fig. 9 is a detail view of a modified form of sweep.

Fig. 10 is a sectional view of a separating apparatus composed of a plurality of superposed rectangular trays with travelling sweeps spaced apart on endless chains.

Fig. 11 illustrates an arrangement within an enclosing tank of superposed inclined trays with reciprocating sweeps.

Fig. 12 is a section on line 12-12 of Fig. 11, and

Fig. 13 is a fragmentary detail plan showing the manner of connecting the reciprocating sweeps to the vertical supporting bars or channel irons.

The apparatus shown in Figs. 1 and 2 comprises a cylindrical tank A within which a plurality of trays B, B', B^2 are arranged. The tank A may be of large dimensions, say 12 feet high by 20 feet in diameter, but these dimensions may be varied within wide limits. The tank is, of course, suitably supported on appropriate framework which, it is thought, it unnecessary to show

in the drawings, and any desired number of trays within the limits of the dimensions of the tank may be used. The tank A has at the top an overflow launder a communicating with a discharge pipe a' and at the bottom of the tank is preferably, though not necessarily, formed with a depression or hopper a^2 at the center of the tank which communicates with a valved discharge pipe C. Centrally suspended within the tank A is a hollow shaft D which terminates at d' near the bottom of the tank. This hollow shaft may be supported or suspended in any suitable way and it is revolved slowly by any suitable driving mechanism E. The trays B, B', etc., are supported within the tank A in any suitable way. As shown the tank A carries brackets b and the trays are provided with flanges or brackets b' which rest on the brackets b. The trays are of somewhat less diameter than the tank and are arranged within the tank in such manner as to provide spaces X between their sides and the side of the tank. The tank A is, of course, made strong enough in any suitable way to sustain the pressure of the weight of liquid which it contains. The trays may be made relatively light as the weight which they carry is comparatively small. The hollow shaft D extends centrally through the trays and each tray is preferably, though not necessarily, formed at the center with a depression or hopper F through which the hollow shaft extends.

In the apparatus shown, and as preferred, the shaft D carries slowly rotated sweeps G for promoting or assisting in the discharge of the thickened material. Those sweeps comprise radially extended arms g, or H, H' in Fig. 5, preferably carrying vanes or blades g', g^2,

g^3 or H^2. The effect of these sweeps, which are slowly rotated, is to promote or assist in the discharge of the thickened materials from the center of the trays through outlet pipes. It is only by the use of sweeps that it becomes possible to handle the slimes in substantially flat bottomed tanks. With coned bottom tanks of sufficient inclination, 60° or more, they are not necessary.

Referring again to Figs. 1 and 2, it will be observed that the sweeps G are supported from the hollow shaft D by split hubs I of well known construction, and adjustable braces J of well known form are also employed for the purpose of holding the conveyors in proper position. The shaft D is provided with openings d to receive the thickened material from each tray. These openings are preferably located adjacent the depressions or hoppers F and the vanes g^2 at the inner ends of the conveyor arms g are preferably enlarged and extend downward into said depressions or hoppers for the purpose of assisting in the discharge through the openings d of the thickened material. The trays are separated from each other in the manner shown and in order to shut off communication between a tray and the one immediately above it, I provide on the bottom of each hopper F a strip of rubber or other suitable material L which rests on the top of the split hubs I. This will prevent the flow of slimes or pulp out of one hopper into a tray immediately below it or the flow of liquid upwardly from one tray into an adjacent hopper above it. The shaft D also carries sweeps M similar to those before mentioned and operating in the lower portion of the tank A.

In order to feed to the apparatus the pulp or other material to be clarified I preferably

employ the devices shown, although other means may be used for this purpose. As shown, however, the liquid to be treated is conveyed through a trough N to a box N' where it is sub-divided. Gates n or their equivalent may be used to control the flow of liquid from the trough N to the compartments in the box N'. Each compartment in the box N' is connected by a pipe O with a perforated distributing ring or annular header O', and each of the pipes O may, if desired, be provided with a valve P for regulating the flow. The valves shown are of conventional form, but other kinds of valves may be used and these valves may be differently located. In order to avoid the entrapping of air in the liquid feed it is desirable to arrange the compartments of the flow-box N' at approximately the level of the tank overflow so that there will always be some depth of liquid in said compartments. The liquid to be treated is supplied simultaneously through the pipes O and annular headers O' to the several trays. The solids drop to the bottom of the trays while the clear liquid rises and passes over the edge of each tray and then continues upwardly to the overflow launder a of the tank A. The thickened material in each tray flows to the discharge orifices d of the hollow shaft D through which shaft it descends. By reason of this construction, the thickened materials from the three superposed separating trays B, B' and B^2 is discharged into the lower portion of the subjacent tank volume. The point of discharge is here shown at d' quite near the bottom of the tank, but it may be higher up if desired. The lower portion of the tank thus serves as a receptacle for the thickened materials coming from the overflow trays, and at the same time its upper portion serves as a fourth separating element having

its own flowregion for the dilute slimes supplied from the inlet header O' immediately beneath the bottom tray. This lower portion of the tank of large volume gives to the tank a certain advantageous storage capacity and adds flexibility with respect to the degree of thickening which may be attained with a given material, the preliminary thickening taking place in the superposed trays, and in the upper portion of the subjacent tank volume, while the further and final thickening takes place in the lower part of the tank, and the finally thickened materials are discharged with the aid of the sweep M, through an outlet pipe C. It will be observed that the material collected in each tray does not pass to another tray but immediately passes to a common discharge pipe and that the material collected on the bottom of the tank A does not pass to another tray or tank but flows to a common discharge.

By these improvements it will be observed that a very large and extended settling area is afforded within a small cubic space so that space is materially economized and the cost of framework, housing, roofs, and machinery is greatly reduced.

In Fig. 3 the construction of the apparatus is similar in most respect to that shown in Fig. 1. In this case, however, the trays are shown as being formed with inclined bottoms.

The use of coned bottom tanks becomes feasible where the tanks can be nested within the outer tank of the unit as illustrated in this figure, because by this arrangement the increase in vertical height incident to superposing coned bottom tanks is avoided. Furthermore, in this arrangement the effective length of the three lower separation current paths is increased, the current of clear liquid flowing in each case from the

central inlet header O' along the under surface of the overlying cone to the peripheral discharge, while the thickened material flows oppositely to the sub-surface discharge outlets therefor. The parts of the apparatus shown in Fig. 3 corresponding with parts in Fig. 1 are similarly lettered.

Figs. 6 and 7 represent a similar arrangement of superposed coned bottom tanks, but instead of providing for the discharge of the thickened materials from the individual trays into the lower portion of the tank through the central pipe D, the discharge from the individual trays is kept separate, and is led off through the pipes R controlled by the valves R', and the central tube D' passes through the closure comprising an annular mercury seal as shown. This arrangement makes possible the individual control of the materials discharged from each tray.

I may also economize space and secure efficiency in operation by the arrangement of apparatus shown in Fig. 8 where the tanks or trays are separately supported on a suitable framework and the enclosing tank shown in Fig. 1 is omitted. As illustrated the tanks S are supported one above the other in a suitable framework T, the details of which need not be described as such details may be varied and the construction is sufficiently illustrated in the drawings. Each tray is of large diameter and comparatively shallow and each one is provided with an overflow launder s for the clear liquid and with a discharge pipe U which communicates with an orifice in the bottom of the tank near the central portion thereof. Each tank is separately supplied with liquid to be treated through pipes V provided with valves v and communicating with a divided feed box V'. A shaft W extends centrally

through all the tanks and this shaft may be driven by suitable driving mechanism W'. The shaft terminates a short distance above the bottom of the lowermost tank and it is suitably supported or hung in bearings w of any suitable construction. Each tank is provided at the center with a cylindrical casing S' through which the shaft W extends. This casing extends to the top of the tank above the liquid level so that the liquid shall not come in contact with the shaft and shall be confined in the space between the outer walls of the tank and the casing. Mercury seals such as shown in Fig. 6 may be substituted for these casings.

In order to promote or assist in the discharge of the thickened material sweeps G similar in all respects to those hereinbefore described may be employed. The sweeps are connected with shaft W by yokes or frames Y which are made sectional or in two parts as shown and bolted to the shaft and to each of these frames Y is attached a feed launder or overflow header Z perforated at z for the delivery of the liquid. The launder Z supplying the lowermost tank may be supported in any suitable way.

In the apparatus shown in Fig. 10 the several rectangular tanks 1 are supported in a framework 2, and each tank has a transverse supply launder or overflow header 3 at one end and a transverse overflow launder 4 at the opposite end, the supply headers being fed from the divided flow-box 5 through pipes 6 which may have control valves 7. Supported in suitable manner at each end of each tank is a shaft 9 carrying a pair of sprocket wheels 10, one or both of the shafts being slowly driven from a common vertical drive shaft or shafts 11 through

worms 12 and worm wheels 13. A pair of chains 14 run over the sprocket wheels 10 and carry spaced sweeps 15 as shown. The thickened material is discharged through the individual discharge spouts 16 converging to the pipes 17 controlled by valves 18.

In the arrangement of Fig. 11, 12 and 13 the superposed trays 19 are supported in inclined position in the tank 20 by brackets 21 and the transverse T-beams 22. This arrangement has in common with the coned-bottom arrangement of Figs. 3 and 6, the advantage of long separating flow region and opposed current flow of the clear liquid and the thickened material respectively. The several trays have at their ends depending aprons 23 which effectively serve to prevent the admixture of the outgoing thickened material from one tank with the incoming liquid in the subjacent tank. As shown the several trays discharge their thickened material into the vertical space between the aprons 23 and the wall of the tank, and the final discharge of thickened material from the unit is through the common outlet pipe 24; but by extending the aprons to the adjacent tank wall and providing separate discharge pipes for each tray individual discharge may easily be provided for. Each tray has a reciprocating frame 25 carrying a series of sweeps 26, the frames being connected by the bracket arms 33, extending through slots 34 at about half the depth of the tray, to the vertical supporting bars 27 operated by the driven cam 29 through the levers 30, 31 and 32.

In the operation of the apparatus in any of its various forms the liquid to be treated is fed to the several headers through the supply pipes and the overflowing streams from the several trays are led off,

separately or united as the case may be. The result is a plurality of superposed separating flow regions simultaneously operating within the single unit. The discharge of the thickened materials takes place from the bottoms of the several trays, assisted by the slowly moving sweeps if necessary. By this expedient a large settling area is obtained on a relatively small floor space and the parts are compactly arranged. Roofing or housing may be used which is much smaller than would be necessary for covering or enclosing separate tanks and a single driving shaft may be employed to operate all the sweeps, whereas if the tanks were spread out over an extended area, separate driving machinery and accessories would be required.

In each of the arrangements shown in Figs. 1, 3, 6, 11 and 12, each of the separating regions, excepting the upper one which is open to inspection, is provided with a sampling cock Q, so that if the overflow on top of the tank is cloudy, it is possible to determine in which of the separating regions the trouble arises. In the arrangements shown in Figs. 8 and 10, this is not necessary because the several flow regions are individually open to inspection.

In all forms of the apparatus shown space is economized and the cost of installation and operation are largely reduced. The apparatus is in each instance organized to operate continuously, but may be operated intermittently if desired. In some respects the apparatus shown in Figs. 8 and 10 has advantages as the behavior of the material in such apparatus may be more closely watched, but the other arrangements shown have the advantage that the height of the apparatus is reduced and the total discharge is at the top of the tank

thereby conserving the mill head, which is an important point in the practical handling of the large volumes of material. Some of the arrangements have the further advantage of the added flexibility due to the subjacent tank volume beneath the superposed trays, but a like advantage may be attained in the arrangement of Figs. 8 and 10, for example, by emptying the materials from the upper trays into the lower tray for final thickening and storage.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A separating apparatus of the kind described comprising a number of superposed trays, tanks or the like, provided with sweeps or the like, said tanks being shallow and of such depth that the settling zone is located substantially directly beneath the zone of surface current or flow disturbance, for the purpose specified.

2. A separating apparatus of the kind described comprising a number of superposed trays or tanks provided with sweeps or the like, each of said trays or tanks being approximately three feet or less in depth, for the purpose specified.

3. A separating apparatus of the kind described comprising one or more shallow trays or tanks preferably superposed and provided with means such as sweeps for establishing an underflow of the thickened material from the tanks, said tank or tanks being arranged in a containing tank which is preferably provided with a sweep or its equivalent at its lower end, for the purpose specified.

4. A separating apparatus of the kind described in which the material is preliminarily thickened in one or more separating tanks, and is subjected to a final thickening in a containing tank within which said separating tanks are located, for the purpose specified.

5. A separating apparatus of the kind described in which the chute or the like for delivering the material

to be operated on, is divided along part of the length thereof into a number of channels from which extend conduits or the like leading to a series of separating trays, for the purpose specified.

6. A separating apparatus of the kind described in which each of the superposed trays or tanks arranged in a common containing tank is provided with a sampling cock which, when open, permits material to flow from said superposed trays to the outside of the containing tank, for the purpose specified.

7. The improved separating apparatus constructed, arranged and adapted to operate substantially as described with reference to the accompanying drawings, for the purpose specified.

(26)

3. The Applicant, therefore, applies for leave to file a Specification of the Invention pursuant to Part I of the Inventions and Designs Regulation, 1894.

John Van Nostrand Dorr

I, the Applicant above named, do declare that the facts stated in this Application are true to my knowledge, except as to matters stated on information and belief, and as to those matters I believe them to be true.

DATED this 14th day of May 1914

John Van Nostrand Dorr

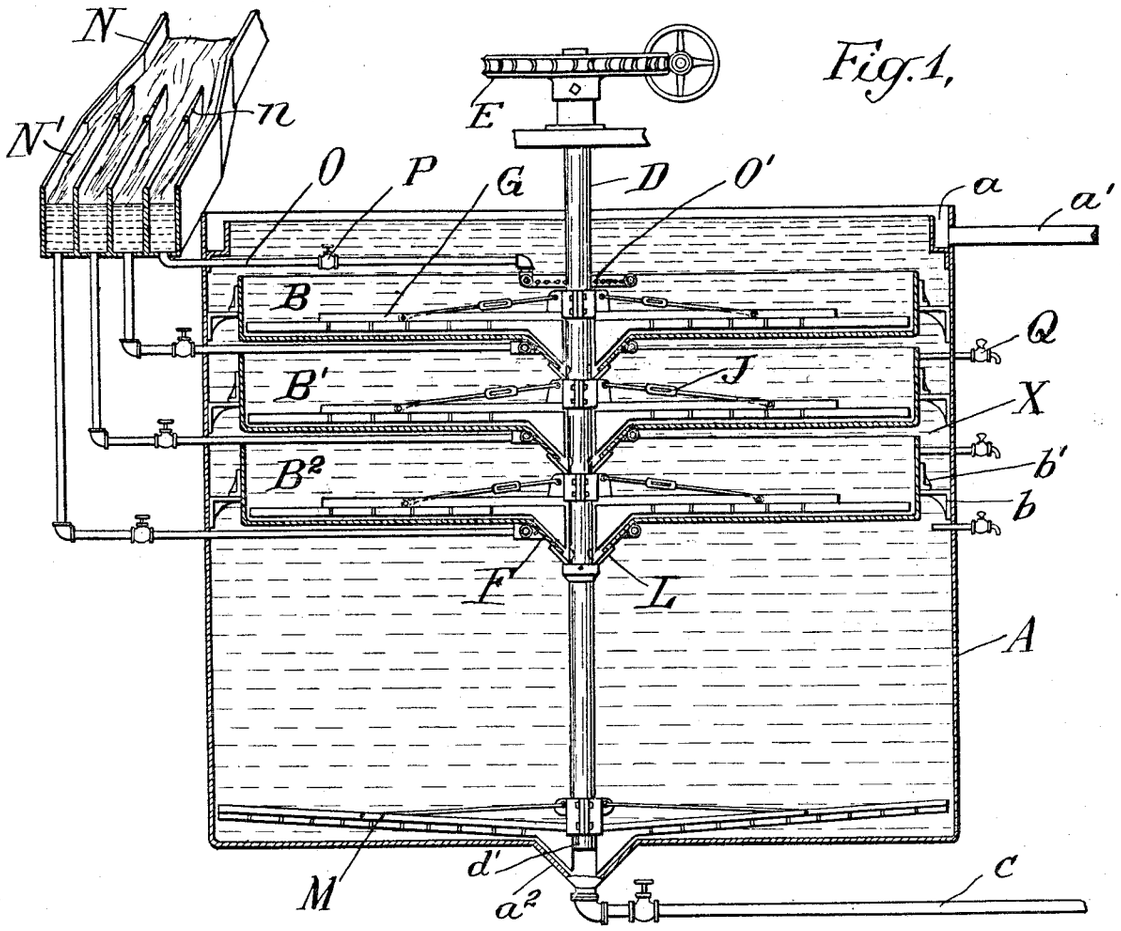

Fig. 1,

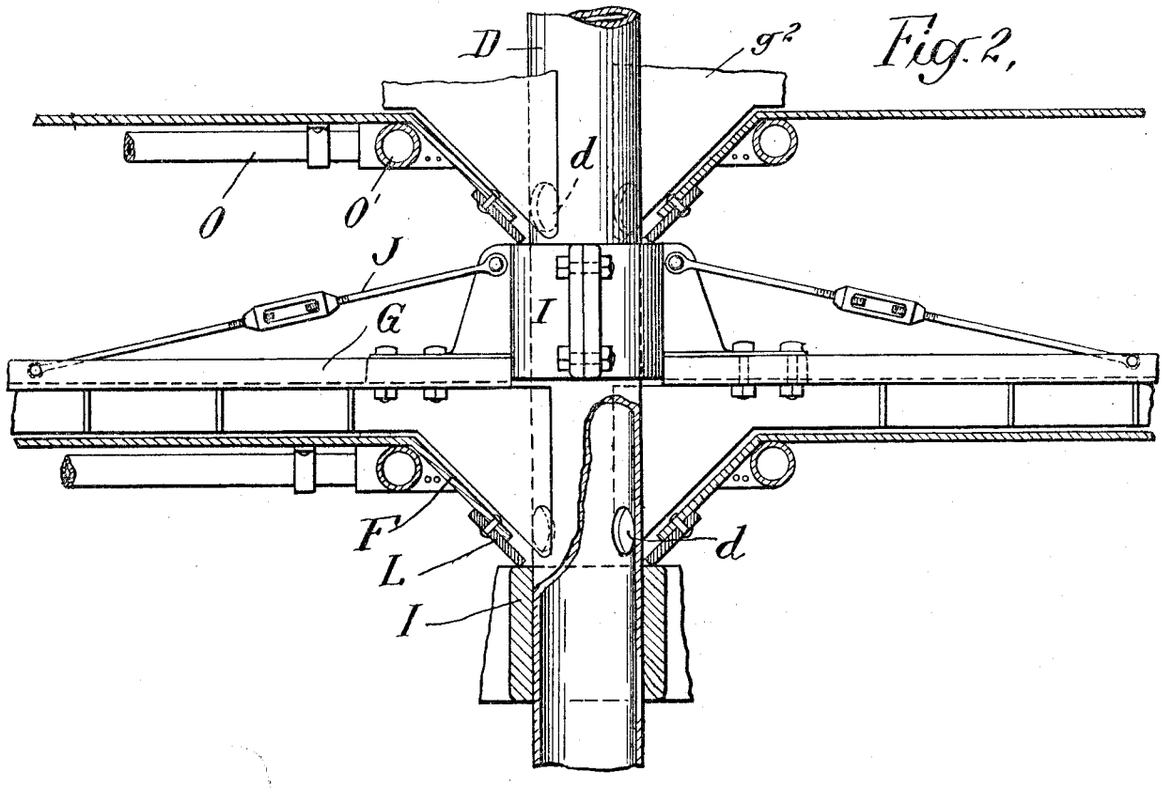

Fig. 2,

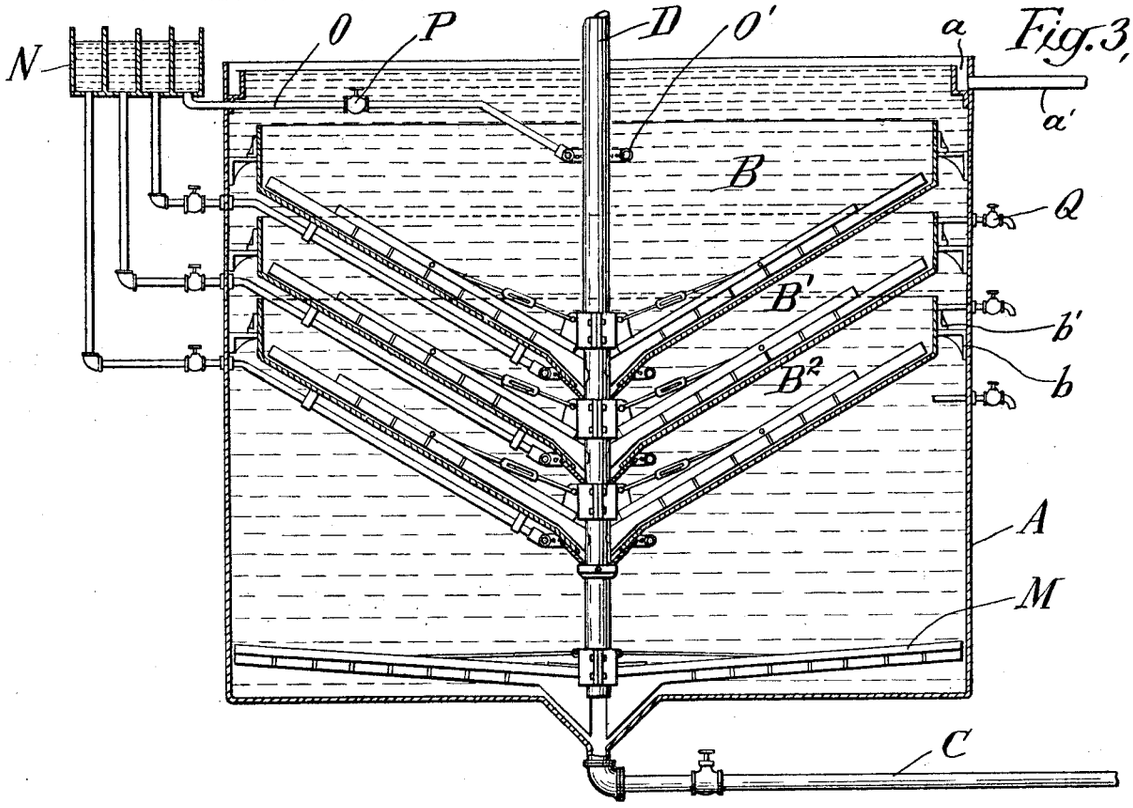

Fig. 3,

Fig. 4,

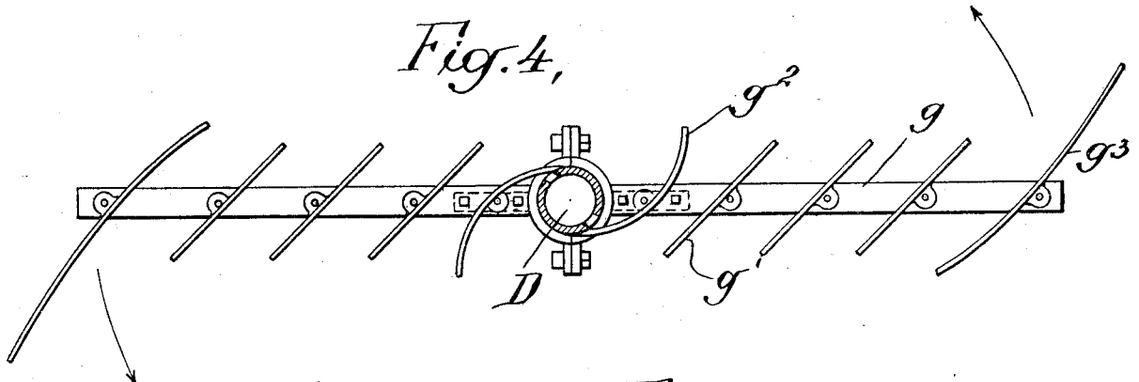

Fig. 5

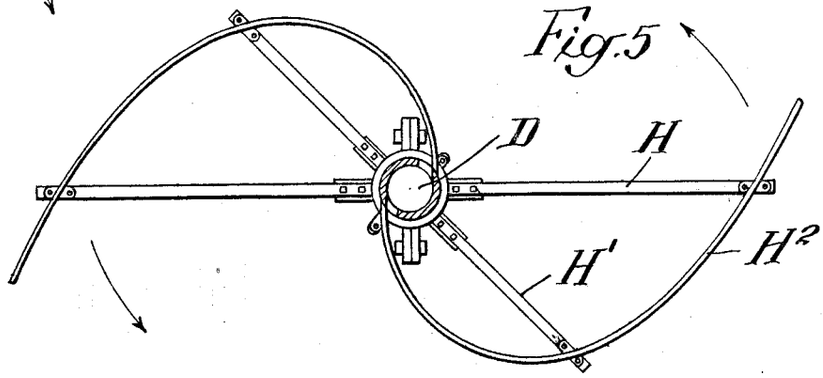

Fig. 6,

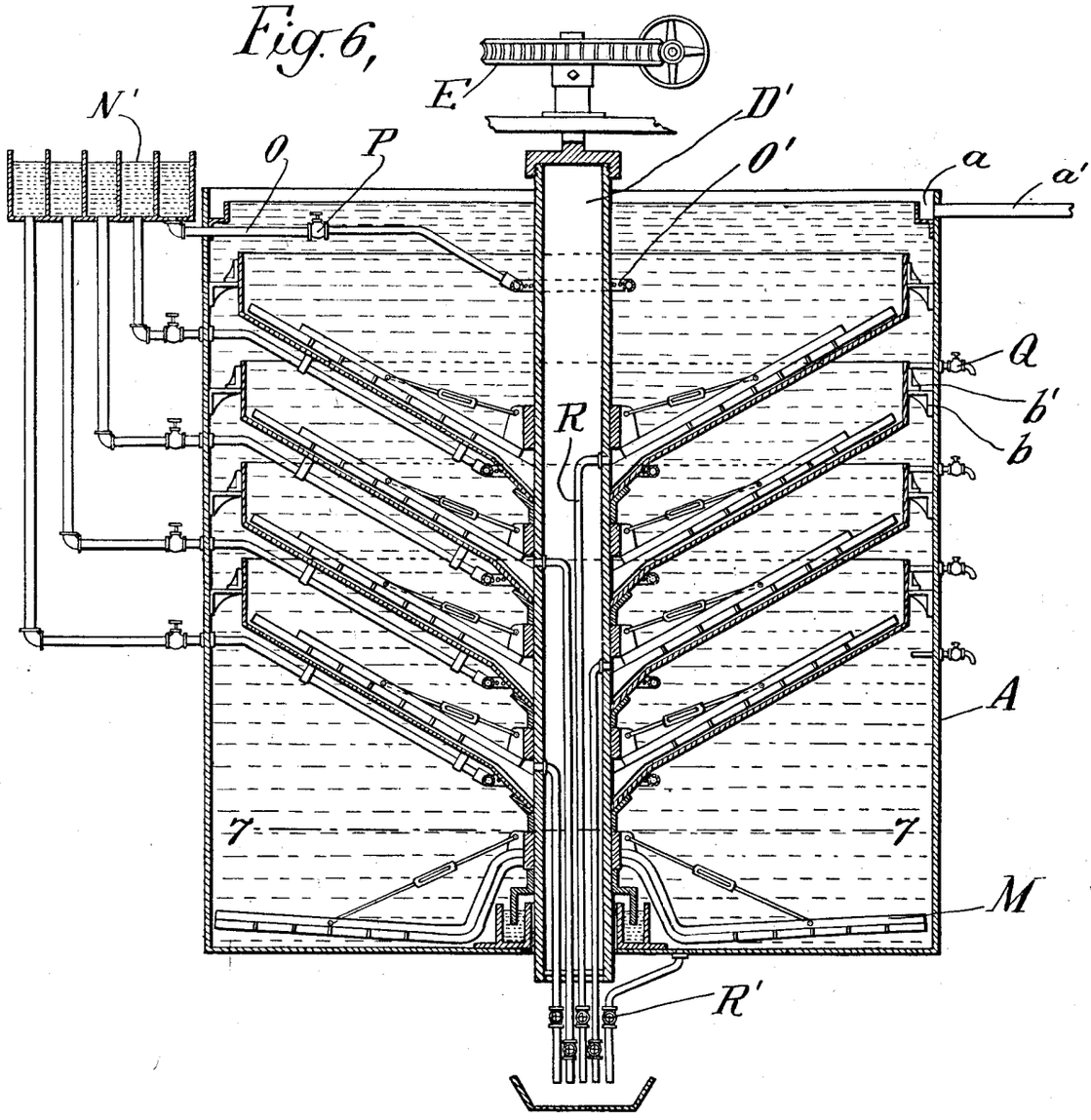

Fig. 7

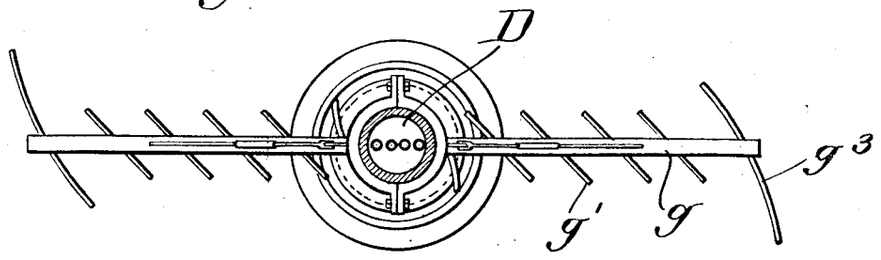

Fig. 8

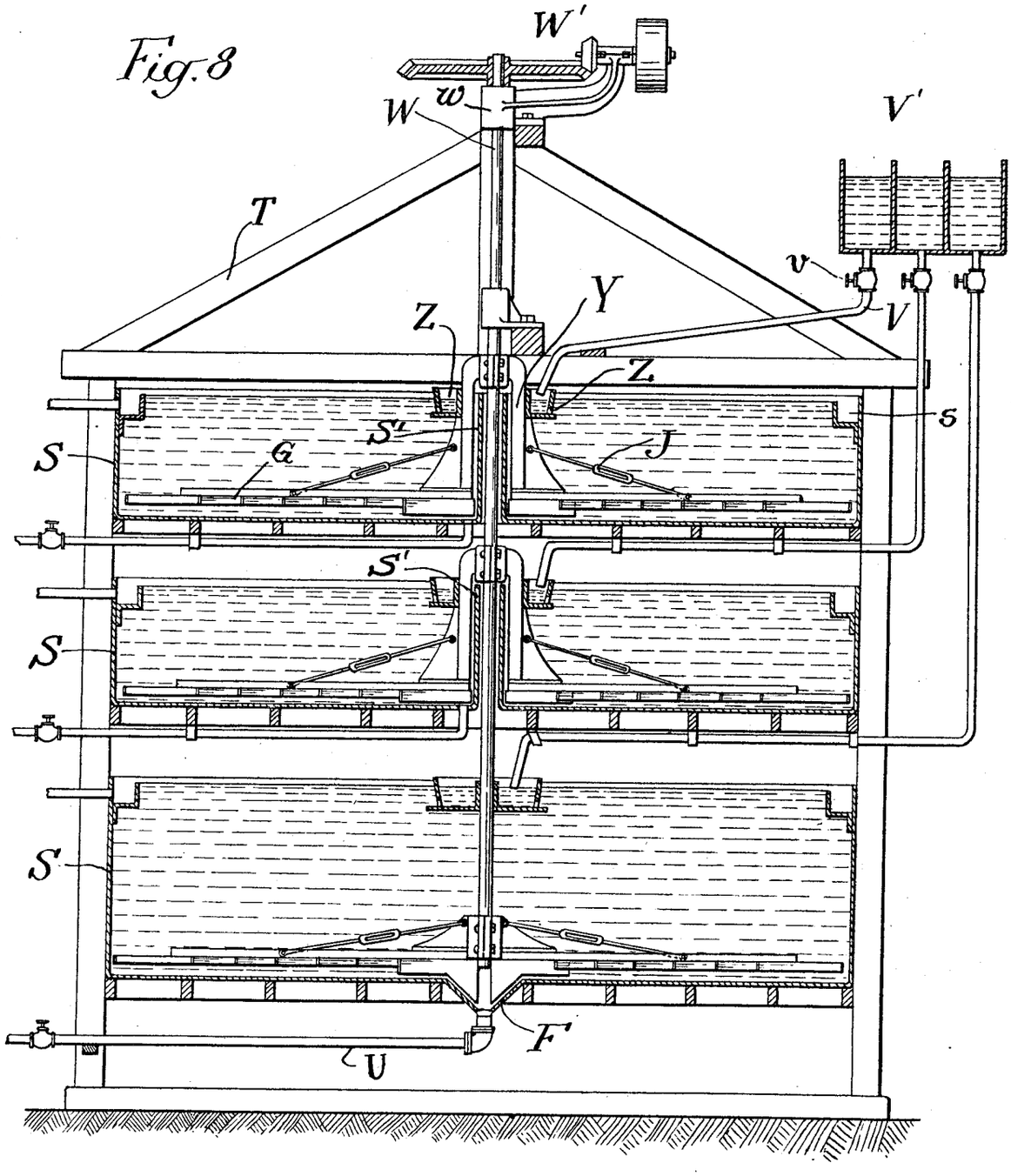

Fig. 9

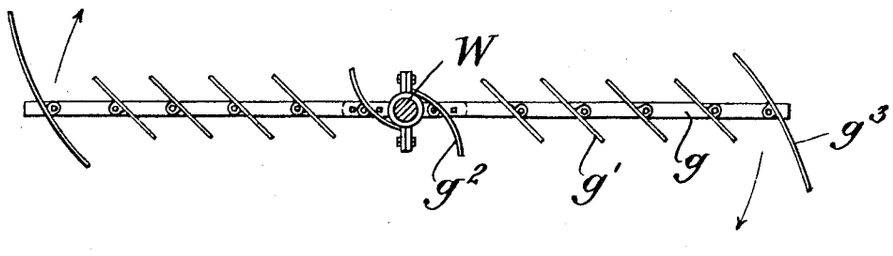

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Fig. 10,

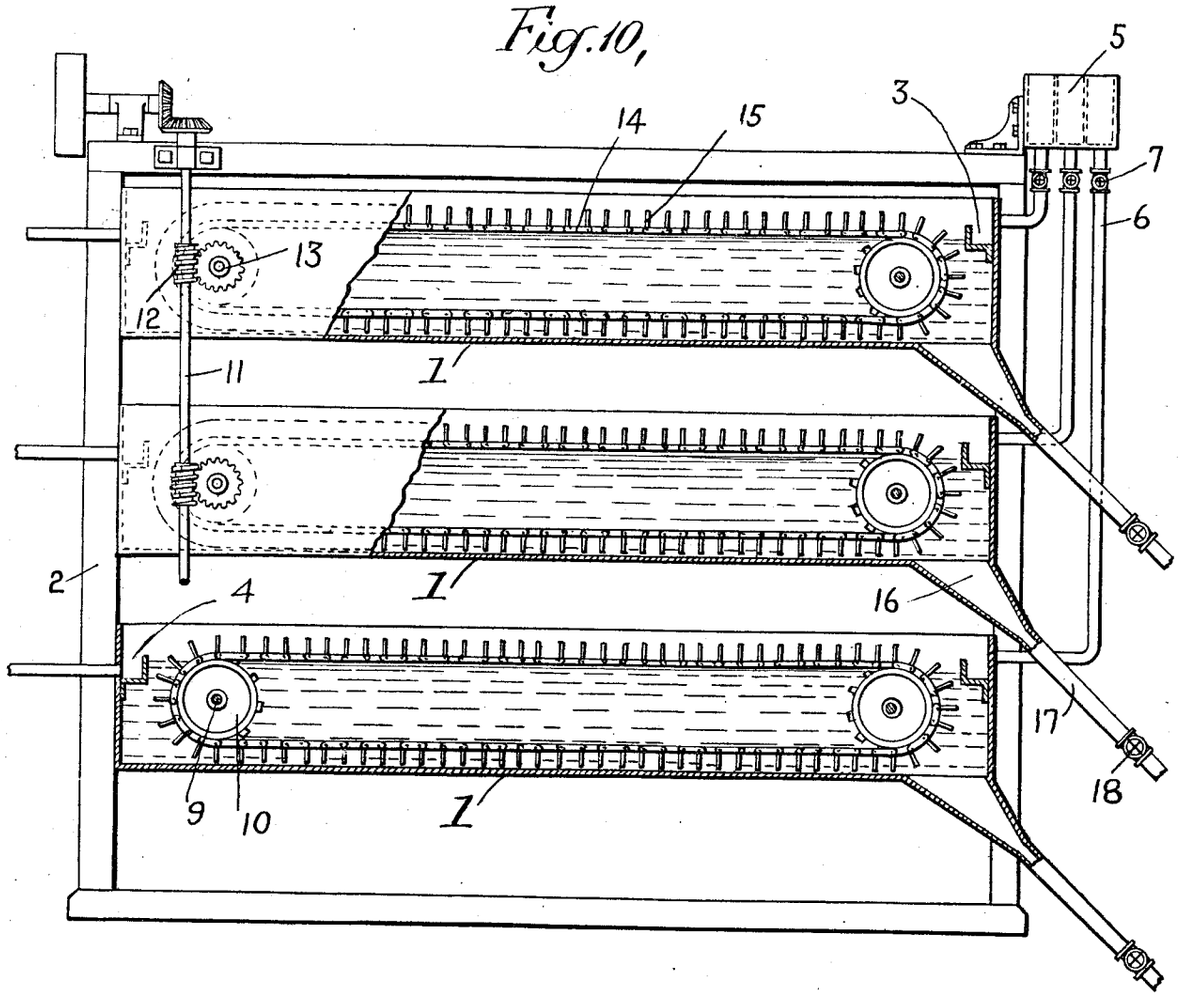

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Fig. 11,

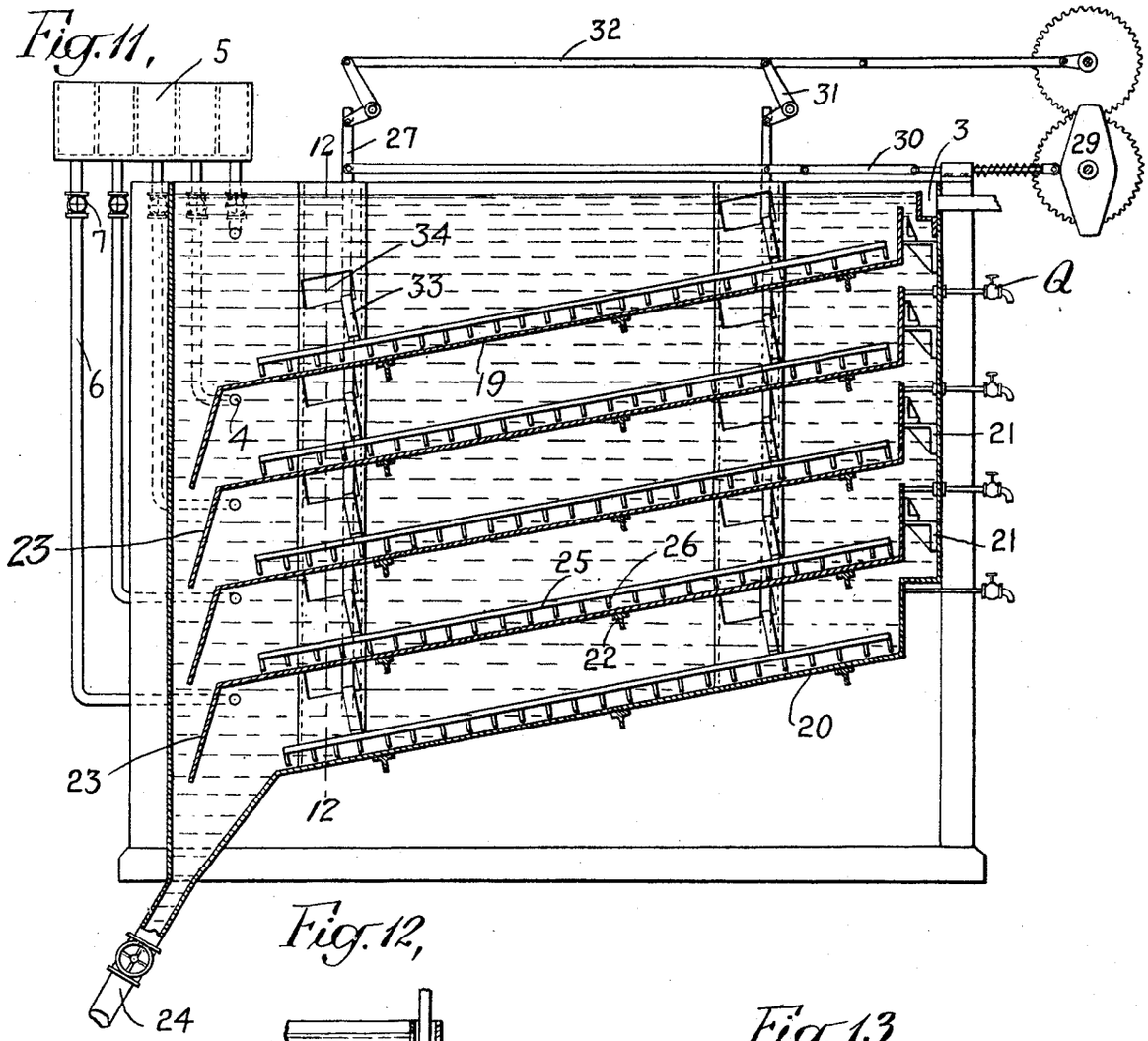


Fig. 12,

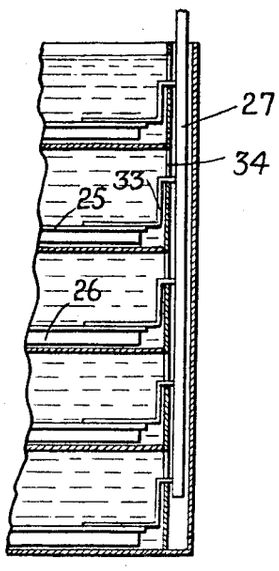
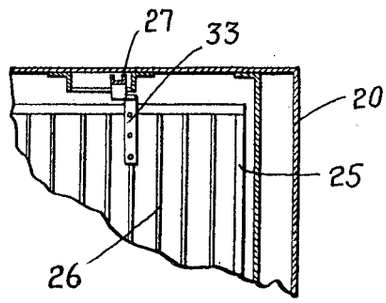


Fig. 13,



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Gen. 156-14-9

(33

GOVERNMENT OF MYSORE

General Department.

Register No. 1 **of 1914-15**

Bangalore, the 16 October 1914

WHEREAS an application, dated the 14th May 1914 and received on the 16th July 1914, has been submitted under Section 5 of the Mysore Inventions and Designs Regulation, 1894, by Mr. John Van Nostrand Dorr of 730, First National Bank Building, Denver, Colorado, United States of America, Metallurgical Engineer

(hereinafter referred to as "the applicant") for leave to file a specification of an invention for "Apparatus for the separation of finely divided solids from liquids",

And whereas the applicant has duly complied with all the requirements of Section 5 of the said Regulation;

The Government of Mysore are pleased, under Section 6 of the said Regulation, to authorize the applicant to file a specification of the said invention in accordance with the provisions of the said Regulation.

ORDERED, that the applicant be, and he is hereby, informed accordingly.

By Order of the Government of Mysore,

Mysr 12/10

Secretary to the Govt. of Mysore, Gen. and Rev. Depts.

Certified that the fees prescribed in the fourth schedule to the Mysore Inventions and Designs Regulation, 1894, in respect of the application for leave to file the said specification and of the filing thereof have been paid by the applicant, and that the specification hereinbefore described has been duly filed in accordance with the provisions of Section 8 of the said Regulation on this the twenty-seventh day of November 1914.

Mysr

Secretary to the Govt. of Mysore, Gen. and Rev. Depts.

VB

(*Section 8 of the Inventions and Designs Regulation, 1894.*)

8. (1) If within six months from the date of an order under Section 6, Sub-Section (1), or within such further time, not exceeding three months, as the Government of Mysore, in its discretion, may, on cause shown to its satisfaction and on payment of the fee prescribed in that behalf in the fourth schedule, see fit to allow, the applicant causes a specification of his invention to be filed in manner by this Part required, and the fee prescribed in the fourth schedule in respect of the filing of the specification to be paid, the applicant shall, subject to the other provisions of this Part, be entitled to the exclusive privilege of making, selling and using the invention in the Territories of Mysore, and of authorizing others so to do, for a term of fourteen years from the date of the filing of the specification.

(2) But an exclusive privilege in respect of an invention of a new manufacture shall, notwithstanding anything in Sub-Section (1), cease, if the inventor fails to pay, within the time limited in that behalf by the fourth schedule, any fee prescribed in that schedule in respect of the continuance of the privilege.

(3) If, nevertheless, in any case, by accident, mistake, or inadvertence, an inventor fails to pay any such fee within the time so limited, he may apply to the Government of Mysore for an enlargement of the time for making the payment.

(4) Thereupon the Government of Mysore may enlarge the time accordingly, on payment of the fee prescribed in that behalf in the fourth schedule, and subject to the following conditions, namely :—

(*a*) the time for making a payment shall not in any case be enlarged for more than three months ; and

(*b*) if any suit is instituted in respect of an infringement of the exclusive privilege committed after a failure to make a payment within the time limited for the making thereof and before the enlargement of that time, the Court disposing of the suit may, if it thinks fit, refuse to award or give any damages in respect of the infringement.

GPB—500—7-4-09.

G. R. S. 26]

File No. 156-14

Serial No. 10.

Diary No. of letter replied to 2484

No. 93684.

General and Revenue Secretariat

( )

, the 191 .

To Messrs Rempfry & Son,

Solicitors & Patent Agents, Calcutta.

Gentlemen,

Date of issue 16-10-14

Signed by Mr. H. R. Row.

With reference to your letter of the 13th July 1914, I am directed to forward herewith the G.O. No. G. 31683 Dm 156-14-9 dt 16-10-1914, authorising Mr. John Van Nostrand Dodd, to file a specification of his invention for "Apparatus for the separation of finely divided solids from liquids", and to request that the fact may be communicated to the party concerned.

I have &c,

over.

SUBJECT.

Asst Secretary
17/10.
For the Secretary
to Govt

REGISTERED.

To

THE ~~CONTROLLER OF PATENTS~~, SECY TO THE GOVT OF MYSORE,
~~PATENT OFFICE~~, GENL. & REV. DEPTS.,
~~CALCUTTA~~. BANGALORE,
MYSORE.

FROM

REMFRY & SON,
SOLICITORS AND PATENT AGENTS,
Dated No. 4415
CALCUTTA.

1914-1915 Dated
SECTION Gen : Mis
File No. 156-14
No. 11

CALCUTTA, the 24th November 1914.

DEPT.	P.	FILE LR.	M.
FILE INDICATION			
Mysore Pats.			

SIR,

re J. V. N. DORR. (MYSORE)

No. 1/14-15 *dated* - -

Pursuant to the Order granting leave in this matter dated - October 1914, Register No. 1 of 1914-15, we have the honour to forward herewith 4 copies of the Specification of JOHN VAN NOSTRAND DORR, of 730, First National Bank Building Denver, Colorado, United States of America, Metallurgical Engineer, in respect of his Invention for "APPARATUS FOR THE "SEPARATION OF FINELY DIVIDED SOLIDS FROM LIQUIDS".

The abovementioned Order is enclosed and we solicit the favour of your filling in the Certificate at foot thereof and having same signed.

A Post Office Order for Rs. 30/- is sent to-day.

We have the honour to name our office in Calcutta as the Address for Service under the Act.

We have the honour to be,
Sir,
Your very obedient servants,

Enclos.
4 Specns.
Order.

I.M.B.

P/O (Genl.) 1,000—4-2-14. [1,000—17-3-11]

MYSORE GOVT, GEN. & REV. SECRETARIAT,

No. G8096 / fr 156-14-12

Dated Bangalore, 1st Feb 1905.

NOTIFICATION.

(PATENT.)

The following specification of an invention has been filed in accordance with Sections 8, 9, 10 and 11 of Regulation XI of 1894 (The Inventions and Designs Regulations) and is open to inspection at the Mysore Government Secretariat on application to the Secretary to the Government of His Highness the Maharaja of Mysore, General and Revenue Departments, and on payment of a fee of one Rupee.

By Mr. John Van Nostrand Dorr, of 730, First National Bank Building, Denver, Colorado, United States of America, Metallurgical Engineer.

"Apparatus for the separation of finely divided solids from liquids".

By Order,

Mon 23/1

Asst. Secretary.

To

The Compiler, *Mysore Gazette*, for publication. VB

No. G 8097
Fin. 156-14-13

Encl: Two

MYSORE GOVT. GEN. & REV. SECRETARIAT,

Dated Bangalore, 1 & 7 Jan 1915.

From

The Secretary to the Government of H. H. the Maharaja of Mysore,
General and Revenue Departments.

To

Messrs Rempry & Son,
Solicitors & Patent Agents,
Calcutta

~~Sir~~, Gentlemen

With reference to your letter dated the 24th Nov. 1914 I am directed to forward copy of a Notification No. G 8096/Fin. 156-14-12 dated 1st January 1915 issued by this Government in regard to the invention filed by you under Regulation XI of 1894 (The Inventions and Designs Regulations.) and Request that the fact may be communicated to the parties concerned.

The order granting permission to file specification is herewith returned, with the certificate at foot, duly filled in and signed.

I have the honor to be,
~~Sir~~, Gentlemen
Your most obedient servant,

Mon
23/1
for Secretary.

VS

3/2
Do No 7

19 .

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To
The Deputy Commissioner,
Treasury Deptt, Bangalore.

Dated
Despatched | 1 st 7-Feb '15
Received

General No. 9 8098
No. Fin 156-16-14
Enclosure No. Rs 30/-

Has the hona to forward herewith a sum of Rs 30/- (Thirty only) ~~being the amount~~ received from Messrs Remfry & Son, Calcutta, being the amount payable under Schedule IV Clause 2 of the Mysore Inventions and Designs Regulation No XI of 1894 for filing a specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr. John Van Nostrand Dorr of Colorado, U. S. A., and to request the favor of an acknowledgment for the receipt of the amount.

By Order,
Mor 23/1
for Secretary

GPB—20,000—24-10-10.

VS

G.R.S. 29A]

19 .

From

Secy. to the Govt. of His Highness
The Maharaja of Mysore,
Genl. and Rev. Dept.

To
(1) The State Geologist in Mysore
(2) " Supdt, Govt Museum
(3) " Chief Engineer of Mysore

Dated
Despatched | 1st Feb 15
Received

General No. G 5079-8101
No. 150-1st-15

Enclosure No. One Sheet.

Has the hona to forward herewith for record in his office copy of the specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr John Van Nostrand Dorr of Colorado, U.S.A., and to request the favor of an acknowledgment.

By Order,

MSR
23/1
for the Secretary
15

GPB—20,000—24-10-10.

Rs 30/- ✓

Receipt No: 204

Book No. 1057 16

No 72

Treasury dated 5 February 1915

Received from The Officiating Secretary to Government of His Highness the Maharaja of Mysore Ind: Rev: Estb.

Rupees Thirty

Annas Nil and Pies Nil being on account of

the amount received from Messrs: Remfry & Son Calcutta payable for Ry Ld Commissioner divided Salts from Liquid fuse Rocket Nos) 4 @ 2 = 15

In charge of Treasury.
Bangalore District Treasury

Noted and returned

4/2/15

GPB —1,000—13-2-14

M.G.D. 13]

MYSORE GEOLOGICAL DEPARTMENT.

DATED BANGALORE, 3rd February 1915.

No. 480.

DIARY No. 6607

14-1915
ACTION fee : nil
G.M. 156—14
REGD. No. 17

FROM

DR. W. F. SMEETH, M.A., D.SC., A.R.S.M., etc.,
State Geologist in Mysore.

To

D.M. Narasinga Rao, Esquire, B.A.,B.L.,
Offg. Secretary to the Government of His Highness
the Maharaja of Mysore,Gen.& Rev. Depts.

SIR,

I have the honour to acknowledge the receipt of a copy of a specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr.John Van Nostrand Dorr of Colorado, United States of America,forwarded with your docket No.G.8099-8101/G.M.156-14-15, dated 1st February 1915, for record in this office.

I have the honour to be,
Sir,
Your most obedient servant,

Registrar
for State Geologist in Mysore.

C.N.

Mysore Government Museum.

Bangalore. Dated 8th February 1915.

No. 124

6757

From

G.H.Krumbiegel Esquire, F.R.H.S.,
Superintendent, Government Museum
Bangalore.

1914-15
General Secretariat
File No. 156 of 14-15
Page 18

To

The Secretary to the Government of
H.H. the Maharaja of Mysore,
General and Revenue Departments.
Bangalore.

Sir,

I have the honor to acknowledge receipt of copy of a specification of an invention for "Apparatus for the separation of finely divided solids from liquids" by Mr.J.V. Nostrand Dorr of Colorado, forwarded with your docket No. G. 3099-3101/G.M. 156-14-15, dated 1st February 1915.

I have the honor to be,
Sir,
Your most obedient servant,

G.H.Krumbiegel

Superintendent.

1915

From

G. H. KRUMBIEGEL, Esq., F.R.H.S.,
Economic Botanist,
Supt., Mysore Govt. Museum,
Bangalore.

To

The Secretary to the Govt
of H.H. the Maharaja of Mysore
Genl and Rev. Depts.
Bangalore.

Dated

Despatched 8/14 February 1915

Received

General No. 124.

No.

Enclosure No. --

Acknowledging
receipt of copy of a speci-
fication of an invention
for "Apparatus for the separation
of finely divided solids from
Liquids" by M. J. U. N. Dorr.

GPB—600—19-3-13

TELEGRAPHIC ADDRESS: *Statewoks.*

No. 1577

MYSORE P. W. DEPARTMENT.

CENTRAL OFFICE,

Bangalore....~~16th~~ February.....*191* 5.

Fin 7 1567 4-15
cc 19

From

KARPUR SHRINIVASRAO, ESQ., B.SC., L.C.E.,

Chief Engineer of Mysore,

Bangalore.

DIARY No. 7040

To

D.M.Narasinga Rao, Esq., B.A., B.L.,

Offg: Secretary to Government,

General and Revenue Departments,

Bangalore.

Sir,

I have the honour to acknowledge the receipt of a copy of specification of an invention for "Apparatus for the separation of finely divided solids from liquids" filed by Mr.John Van Nostrand Dorr of Colorado, United States of America, forwarded with your No.G.8099-8101/G.M.156-14 dated the 1st instant.

I have the honour to be,

Sir,

Your most obedient servant,

K. P. Srinivasrao

For Chief Engineer of Mysore.

V.N.S.

1914-16

MYSORE P. W. DEPARTMENT.

No. 1817

From

THE CHIEF ENGINEER OF MYSORE,

Bangalore.

To The Secretary to Government General and Revenue DCPks.

Dated Bangalore 13. 2. 1916

Despatched 18. 2. 1916

Enclosure No. Nil.

SUBJECT. Receipt of Govt Order Acknowledging the Specification of an invention for Apparatus for the Separation of finer divided Solids from liquids.